

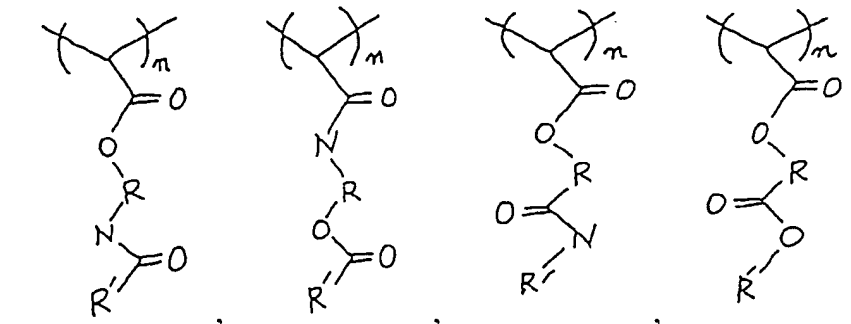
Amendments to the Claims:

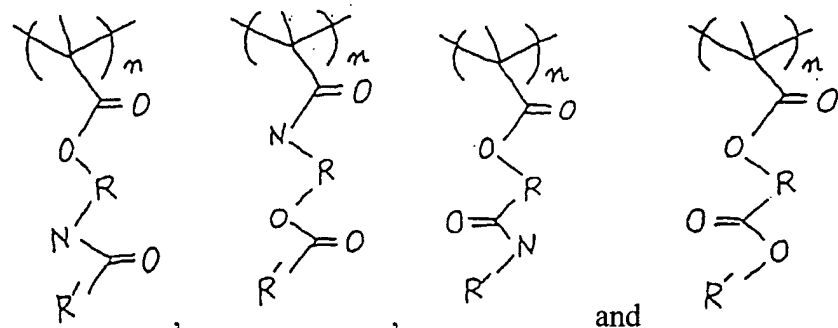
This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-4 (cancelled)

Claim 5 (currently amended): ~~The A polymer compound of Claim 2 which has acid~~
~~amide bonds at two or more sites in the polymer side chain comprising a structure~~
selected from the group consisting of:





wherein:

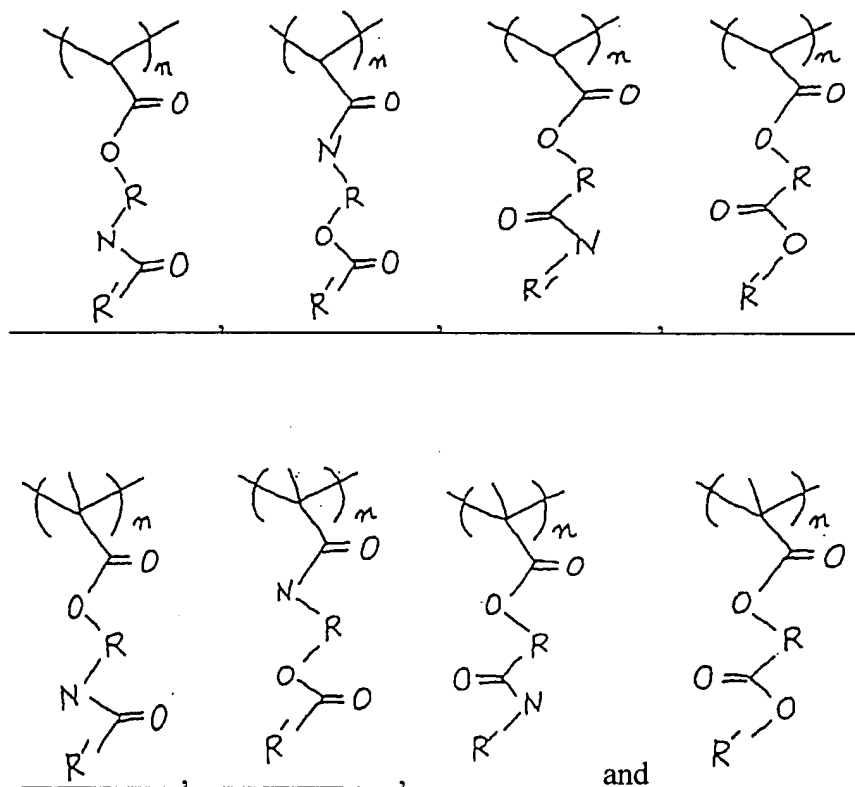
R is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms, or a divalent aromatic hydrocarbon group having 6 to 14 carbon atoms;

R' is a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more hydroxyl groups and 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds and 2 to 9 carbon atoms, or a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds, one or more hydroxyl groups and 3 to 9 carbon atoms; and

n is an integer of 2 or above, wherein said polymer acid amide bonds at two or more sites in the polymer side chain.

Claim 6 (cancelled)

Claim 7 (currently amended): ~~The A polymer material of Claim 2 which has one or more acid amide bonds at one or more sites and/or one or more ester bonds at one or more sites in the polymer side chain comprising a structure selected from the group consisting of:~~



wherein:

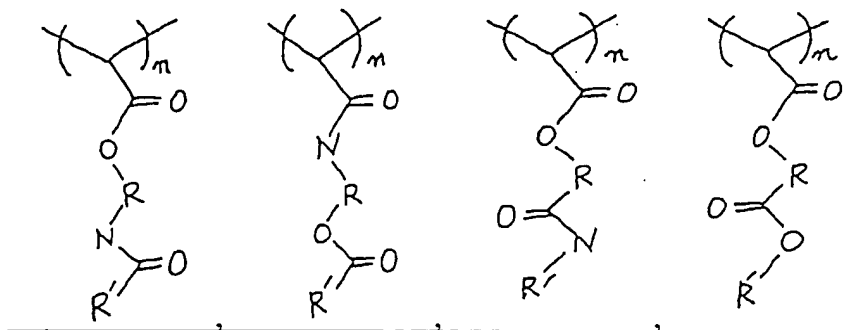
R is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms, or a divalent aromatic hydrocarbon group having 6 to 14 carbon atoms;

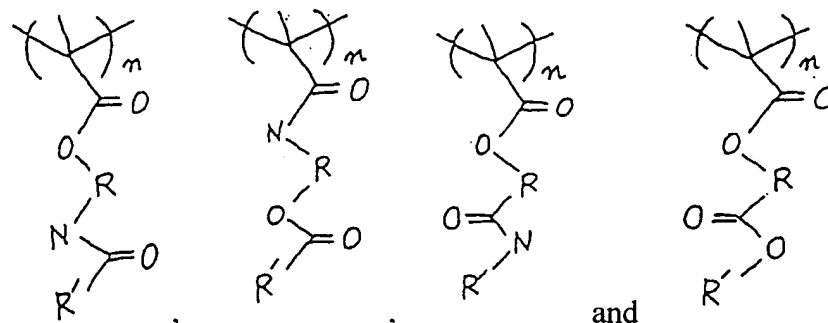
R' is a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more hydroxyl groups and 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more

acid amide bonds and/or ester bonds and 2 to 9 carbon atoms, or a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds, one or more hydroxyl groups and 3 to 9 carbon atoms; and
n is an integer of 2 or above, wherein said polymer has one or more acid amide bonds at one or more sites and/or one or more ester bonds at one or more sites in the polymer side chain.

Claims 8-12 (cancelled)

Claim 13 (currently amended): A material for separating or adsorbing biological samples comprising ~~the a polymer compound of Claim 2 which has acid amide bonds at two or more sites in the polymer side chain~~ comprising a structure selected from the group consisting of:





wherein:

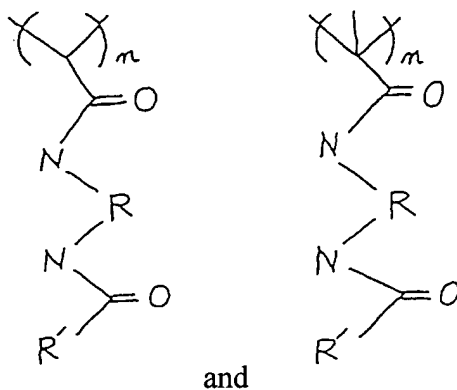
R is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms, or a divalent aromatic hydrocarbon group having 6 to 14 carbon atoms;

R' is a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more hydroxyl groups and 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds and 2 to 9 carbon atoms, or a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds, one or more hydroxyl groups and 3 to 9 carbon atoms; and

n is an integer of 2 or above, wherein said polymer compounds has acid amide bonds at two or more sites in the polymer side chain.

Claims 14-18 (cancelled)

Claim 19 (withdrawn): A polymer compound comprising a structure selected from the group consisting of:



wherein:

R is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms, or a divalent aromatic hydrocarbon group having 6 to 14 carbon atoms;

R' is a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more hydroxyl groups and 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds and 2 to 9 carbon atoms, or a linear or branched aliphatic hydrocarbon group having one or more acid amide bonds and/or ester bonds, one or more hydroxyl groups and 3 to 9 carbon atoms; and

n is an integer of 2 or above.

Claim 20 (withdrawn): The polymer compound of Claim 19 which has a functional group at the polymer chain terminal.

Claim 21 (withdrawn): The polymer compound of Claim 20, wherein said functional group is selected from the group consisting of carboxyl, amino and hydroxyl groups.

Claim 22 (withdrawn): The polymer compound of Claim 19 which has acid amide bonds at two or more sites in the polymer side chain.

Claim 23 (cancelled)

Claim 24 (withdrawn): The polymer material of Claim 19, wherein said polymer compound has acid amide bonds at two or more sites in the polymer side chain.

Claims 25-28 (cancelled)

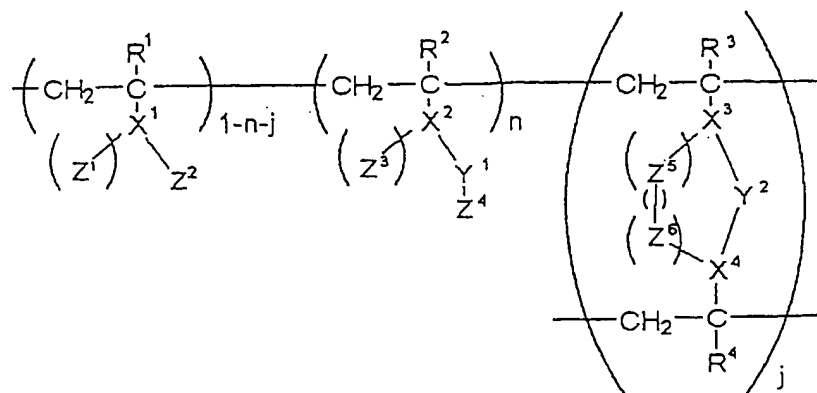
Claim 29 (withdrawn): A process for producing the polymer compound of Claim 19 comprising:

- (1) reacting a compound selected from among aminoalkyl acrylamide, aminoalkyl methacrylamide, aminoalkyl acrylamide hydrochloride and aminoalkyl

- methacrylamide hydrochloride with an acid anhydride or lactone, and purifying the thus obtained product followed by polymerization in a solvent; and
- (2) reacting an alkyl diamine with an acid anhydride, an alkyl acid chloride or di-t-butyl dicarbonate, or reacting a compound having an amino group and an amide bond in its molecule with acryloyl chloride or methacryloyl chloride, and then purifying the thus obtained product followed by polymerization in a solvent.

Claims 30-35 (cancelled)

Claim 36 (withdrawn): A polymer compound comprising the structure:



wherein:

n is the number of the middle kind of monomer unit, j is the number of the right kind of monomer unit, n is from 0.005 to 0.995 (inclusive) and j is from 0 to 0.5 (inclusive);
 R¹, R², R³ and R⁴ are the same or different and each represents a hydrogen atom or a methyl group;

X^1 , X^2 , X^3 and X^4 are the same or different and each represents an acid amide group, an ester group or an ether group;

Y^1 is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms or a divalent aromatic hydrocarbon group having 6 to 14 carbon atoms;

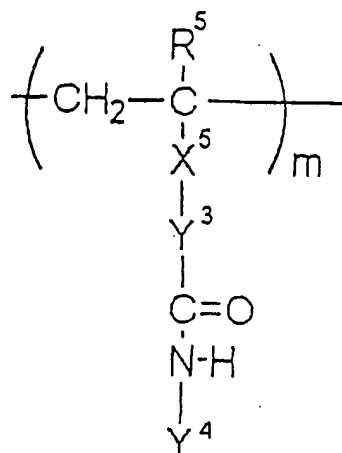
Y^2 is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms, a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms, a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more ether groups or a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more hydroxyl groups;

Z^1 , Z^2 , Z^3 , Z^5 and Z^6 are the same or different and each represents a hydrogen atom, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more hydroxyl groups, a linear or branched alicyclic hydrocarbon group having 1 to 8 carbon atoms and one or more hydroxyl group, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more ether groups, a linear or branched alicyclic hydrocarbon group having 1 to 8 carbon atoms and one or more ether groups, a glycoside having 3 to 12 carbon atoms or a glycoside having 3 to 12 carbon atoms and carrying a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, provided that Z^1 , Z^3 , Z^5 and Z^6 are functional groups bonded respectively to X^1 , X^2 , X^3 and X^4 when they are tertiary amide groups and Z^5 may be bonded to Z^6 ; and

Z^4 is a hydrogen atom, a hydroxyl group, an amide group, a nitril group, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more amide groups, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more carbonyl groups, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more nitril groups, or a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more hydroxyl groups.

Claim 37 (withdrawn): The polymer compound of claim 36 which contains an aromatic hydrocarbon group.

Claim 38 (withdrawn): A polymer compound comprising the structure:



wherein:

R^5 is a hydrogen atom or a methyl group;

X⁵ is an acid amide group, an ester group or an ether group;

Y³ is a linear or branched divalent aliphatic hydrocarbon group having 1 to 8 carbon atoms or a divalent alicyclic hydrocarbon group having 3 to 8 carbon atoms; and

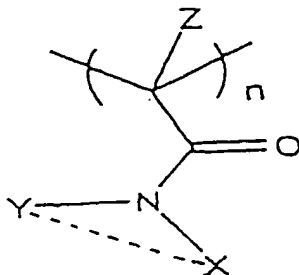
Y⁴ is a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms or a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and one or more hydroxyl groups.

Claim 39 (withdrawn): The polymer compound of Claim 38 characterized in that said repeating unit of the polymer contains two or more amide or ester groups which are either the same or different.

Claims 40-44 (cancelled)

Claim 45 (withdrawn): An adsorption and separation material characterized by containing the temperature-responsive polymer compound.

Claim 46 (withdrawn): A polymer compound comprising a repeating monomer unit represented by the following formula and showing temperature-responsiveness in a solution:



wherein:

Z is a hydrogen atom or a methyl group;

X is a hydrogen atom or a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms and carrying at least one hydroxyl group;

Y is a linear or branched aliphatic hydrocarbon group having 2 to 8 carbon atoms and carrying at least one hydroxyl group, or X and Y may form together a chemical bond; and
n is an integer of 2 or more.

Claim 47 (withdrawn): The polymer compound of claim 46, wherein the monomer is a compound synthesized by reacting acrylic acid chloride, methacrylic acid chloride, anhydrous acrylic acid or anhydrous methacrylic acid with an alkylamino alcohol.

Claim 48 (withdrawn): The polymer compound as claimed in claim 46 which consists exclusively of a repeating unit represented by the formula.

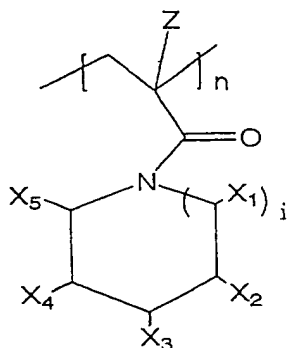
Claim 49 (withdrawn): The polymer compound of claim 46 which contains a repeating unit represented by the formula and has a copolymer structure.

Claim 50 (withdrawn): The polymer compound of claim 46 having a terminal functional group selected from the group consisting of carboxyl, amino, hydrogen and cyano groups.

Claims 51-60 (cancelled)

Claim 61 (withdrawn): A process for producing the polymer compound of claim 46, characterized by dissolving a monomer, optionally together with other monomer(s), and a polymerization initiator in a solution and inducing the polymerization reaction.

Claim 62 (withdrawn): A polymer compound comprising a repeating unit represented by the following formula:



wherein:

Z is a methyl group or a hydrogen atom;

n is an integer of 2 or more;

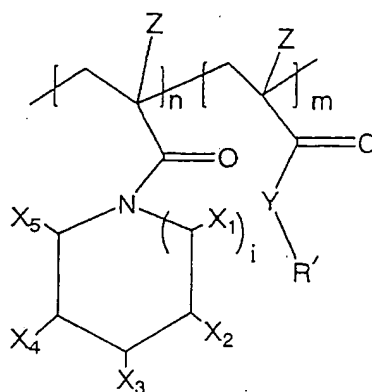
X₁, X₂, X₃, X₄ and X₅ are the same or different and each represents a hydrogen atom, a group R, or a group -CO-NH-R, provided that at least one of X₁ to X₅ is a group -CO-NH-R (wherein R is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond, or a hydrogen atom); and
i is an integer of from 0 to 6.

Claim 63 (cancelled)

Claim 64 (withdrawn): A polymer gel containing the polymer compound of claim 62 which is synthesized by using a crosslinking agent.

Claims 65-67 (cancelled)

Claim 68 (withdrawn): A polymer compound comprising a repeating unit represented by the following formula:



wherein:

$$n+m = 1.0;$$

Z is a methyl group or a hydrogen atom;

n is an integer of 2 or more;

X₁, X₂, X₃, X₄ and X₅ are the same or different and each represents a hydrogen atom, a group R, or a group -CO-NH-R, provided that at least one of X₁ to X₅ is a group -CO-NH-R (wherein R is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond, or a hydrogen atom);

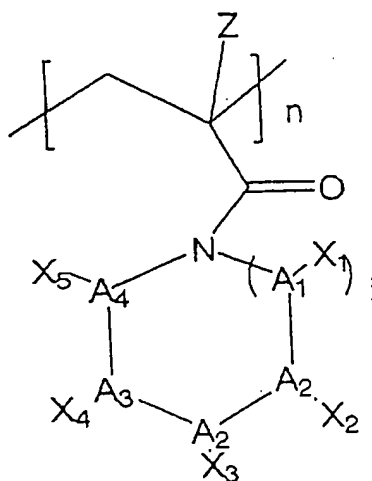
i is an integer of from 0 to 6;

Y is an oxygen atom or a nitrogen atom; and

R' is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond or a hydrogen atom.

Claims 69-74 (cancelled)

Claim 75 (withdrawn): A polymer compound comprising a repeating unit represented by the following formula:



wherein:

Z is a methyl group or a hydrogen atom; n is an integer of 2 or more; X_1 , X_2 , X_3 , X_4 and X_5 are the same or different and each represents a hydrogen atom, a group R, or a group -CO-NH-R, provided that at least one of X_1 to X_5 is a group -CO-NH-R (wherein R is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond, or a hydrogen atom);

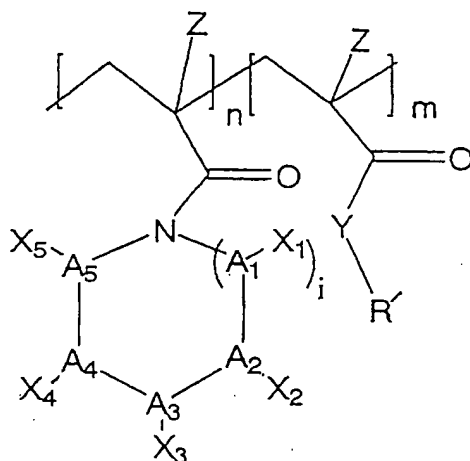
A_1 , A_2 , A_3 , A_4 and A_5 are the same or different and each represents a carbon atom or a nitrogen atom bonding to X_n (wherein n is an integer of 1 to 5) having a group -CO-NH-R or a group -CO-R, provided that at least one of A_1 to A_5 is a nitrogen atom bonding to X_n (wherein n is an integer of 1 to 5) having a group -CO-NH-R or a group -CO-R (wherein R is as defined above); and

i is an integer of from 0 to 6.

Claim 76 (withdrawn): The polymer compound of claim 75 which has a functional group at the polymer chain terminal.

Claims 77-80 (cancelled)

Claim 81 (withdrawn): A polymer compound comprising a repeating unit represented by the following formula:



wherein:

$$n+m = 1.0;$$

Z is a methyl group or a hydrogen atom;

n is an integer of 2 or more;

X_1 , X_2 , X_3 , X_4 and X_5 are the same or different and each represents a hydrogen atom, a group R, or a group -CO-NH-R, provided that at least one of X_1 to X_5 is a group -CO-NH-R (wherein R is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an

alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond, or a hydrogen atom);

A_1 , A_2 , A_3 , A_4 and A_5 are the same or different and each represents a carbon atom or a nitrogen atom bonding to X_n (wherein n is an integer of 1 to 5) having a group $-CO-NH-R$ or a group $-CO-R$, provided that at least one of A_1 to A_5 is a nitrogen atom bonding to X_n (wherein n is an integer of 1 to 5) having a group $-CO-NH-R$ or a group $-CO-R$ (wherein R is as defined above);

i is an integer of from 0 to 6;

Y is an oxygen atom or a nitrogen atom; and

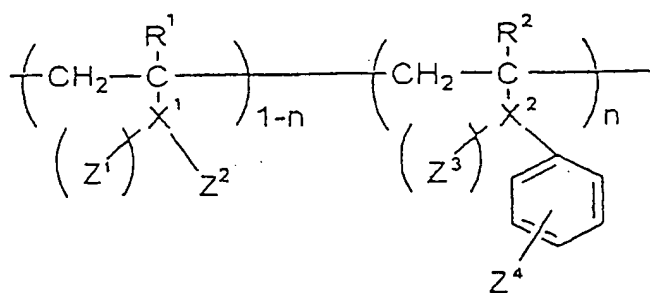
R' is a linear or branched aliphatic hydrocarbon group having 1 to 6 carbon atoms, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one amide bond, a linear or branched aliphatic hydrocarbon group having 1 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one hydroxyl group, an alicyclic hydrocarbon group having 3 to 10 carbon atoms and containing at least one amide bond or a hydrogen atom.

Claim 82 (cancelled)

Claim 83 (withdrawn): The polymer compound of claim 81 which has a functional group at the polymer chain terminal.

Claims 84-87 (cancelled)

Claim 88 (withdrawn): The temperature-responsive polymer compound comprising a repeating unit represented by the following formula characterized in that the temperature-responsiveness thereof is controlled by changing the salt concentration in a solution:



wherein:

n is a value falling within the range $0.005 \leq n \leq 0.995$;

R^1 and R^2 are the same or different and each represents a hydrogen atom or a methyl group;

X^1 and X^2 are the same or different and each represents an acid amide or ester group;

Z^1 , Z^2 and Z^3 are the same or different and each represents a hydrogen atom, a linear or branched aliphatic hydrocarbon group having 1 to 8 carbon atoms, a linear or branched

hydrocarbon group having 1 to 8 carbon atoms and containing at least one hydroxyl group, a linear or branched hydrocarbon group having 1 to 8 carbon atoms and containing at least one ether group, a glycoside having 3 to 12 carbon atoms or a glycoside having 3 to 12 carbon atoms and containing a linear or branched hydrocarbon group having 1 to 8 carbon atoms, provided that Z^1 or Z^3 is a functional group carried by X^1 or X^2 which is a tertiary amide; and

Z^4 is a hydrogen atom, a hydroxyl group, an amide group, a linear or branched hydrocarbon group having 1 to 8 carbon atoms and containing at least one amide group, a linear or branched hydrocarbon group having 1 to 8 carbon atoms and containing at least one carbonyl group or a linear or branched hydrocarbon group having 1 to 8 carbon atoms and containing at least one hydroxyl group which may be attached at an arbitrary position, i.e., o-, m- or p-position.

Claims 89-98 (cancelled)